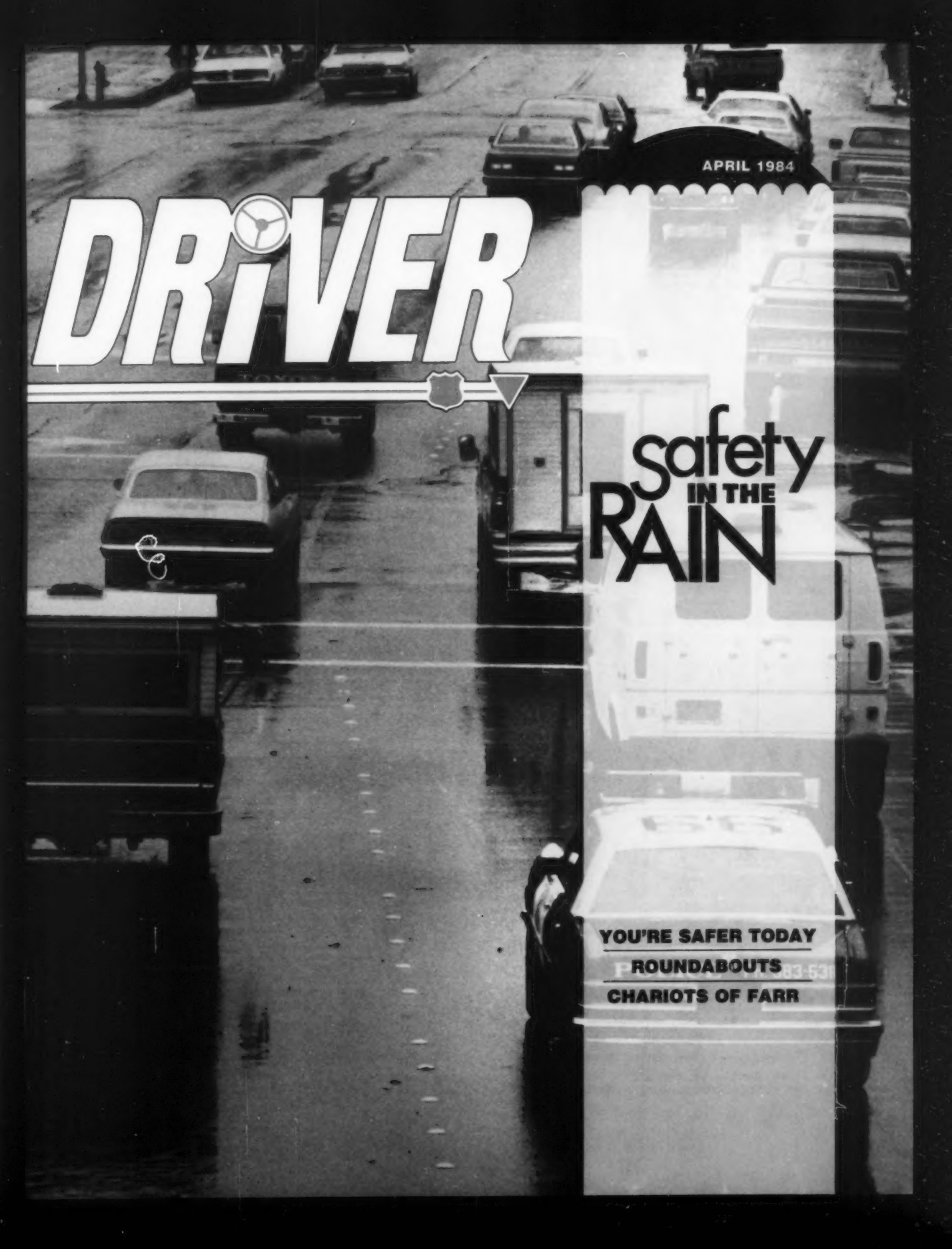

APRIL 1984
DRIVER
safety IN THE RAIN
YOU'RE SAFER TODAY
ROUNDABOUTS
CHARIOTS OF FARR

SURPRISE!

It's SPRING!

Winter and summer are as opposite as two seasons can be, so it's to be expected that spring is so changeable. Spring begins looking like winter, and spends much of its length jumping back and forth between stormy and sunny, wet and dry, cold and warm.

It is this very changeableness that makes it such a challenging environment for driving. You never know what to expect. Sunshine, cold, heat, rain, fog, darkness, wind, snow. It can give your driving abilities a complete test.

If you look carefully, you'll see a couple of headlights in the middle of this photograph. Fog can hide things so well that you won't find them unless you're watching very carefully for them.

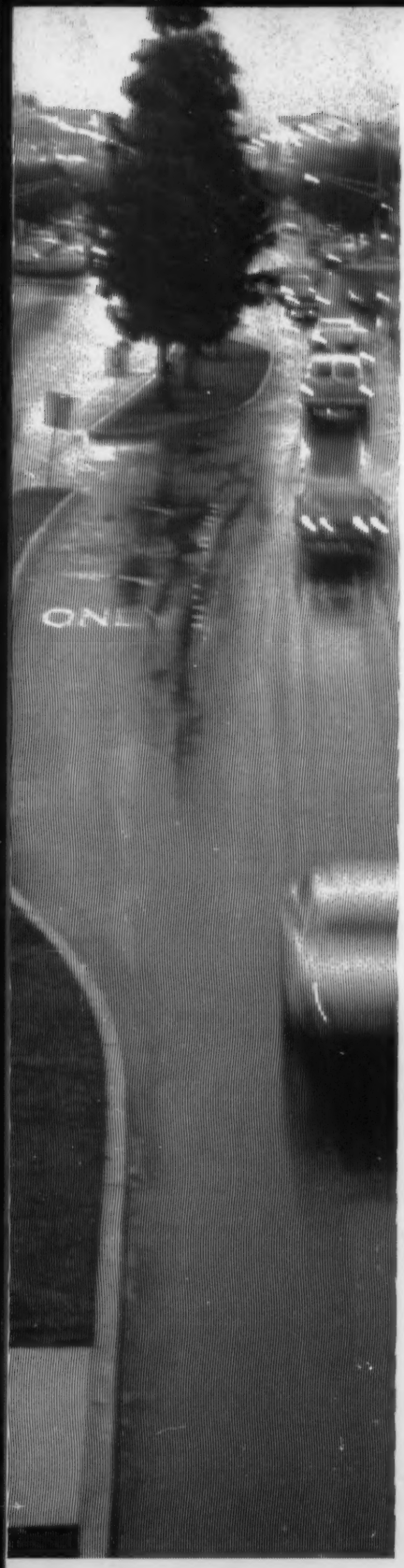
The question is: Are you ready for that complete test? Read on, and we think you will be.

Ready? Your car should be in top running form for this season. It should be in good repair, with all the periodic maintenance done. Does it need an oil change or a tune-up? Are all the accessories working properly — the lights, heater, defroster, wipers? Your owner's and shop manuals will give you the needed advice on what to do, and when and how to do it.

There are a few things we want to give special attention with regards to spring. One of these is the danger of rust.

In winter, many cities use salt to melt the ice and snow and give cars a less slick surface to move on. Salt does this job, but it also does a job on your car. It eats through rubber hoses and wiring insulation, and it rusts bare metal. Hopefully, you've avoided these problems by keeping the car clean during the winter. But pay close attention to it now. The corrosive effect of salt may have damaged your exhaust system during the snowy months. Get any leaks in the pipes or muffler fixed *now*. We have warned about the danger of carbon monoxide poisoning before ("The Lucky Ones," August 83, and "Carbon Monoxide, the Odorless, Tasteless Poison," February 84) and we weren't exaggerating.

Take care of any maintenance that winter has made necessary. One surprise



safety IN THE RAIN

If you like variety, you won't be disappointed by spring.

you don't need is a dead battery. The heavy use of accessories during winter could have left it weak. Keep the cells filled, and charge the battery or replace it as necessary.

As important as crisp handling is in wet conditions, you don't want the surprise of steering that you have to fight. After a few months of bouncing and rumbling over uneven, rutted ice and snow, your wheels could be out of alignment, and that could mean faulty steering when you most need reliable steering. Take the car to the shop and get the front end aligned if you notice squirrelly steering.

Cleanliness: One thing you'll hear us repeat here: Keep the car clean. This is not only so you'll feel prouder of it and give a better report of yourself. It's also for the purpose of seeing. Keep the car clean, especially the windows. If you can see out, you'll see hazards more quickly and you'll increase your safety.

Another reason for keeping the glass clean is glare. The glare from oncoming headlights will be magnified through dirty glass. There will also be glare from sunlight reflected off water on the road. Clean glass will make these conditions a little better. By the way, when the sun comes out and the reflected glare is great, sunglasses could help.

An often-overlooked aspect of the seeing-and-beeing-seen problem is keeping the dirt off the car's lights. The headlights and taillights will get even

continued

THE TRAFFIC SAFETY MAGAZINE FOR THE MILITARY DRIVER

DRIVER

DEPARTMENT OF THE AIR FORCE
HQ AIR FORCE INSPECTION
AND SAFETY CENTER
Norton Air Force Base, California
92409

AFRP 127-1 VOLUME 17 NUMBER 11
APRIL 1984

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PUBLISHED MONTHLY
IN COOPERATION
WITH THE
DEPARTMENT OF THE ARMY
AND THE
DEPARTMENT OF THE NAVY

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Entered as a publication at the Second-Class rate (USPS No. 586-430) at San Bernardino Postal Service, 1331 South E Street, San Bernardino, CA 92403.
SUBSCRIPTION — DRIVER is published monthly and is available for sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. Back issues are not available. Changes in subscription mailings should be sent to the above address. Use of funds for printing this publication has been approved by Headquarters, United States Air Force, Department of Defense, Washington, D.C. No. payment can be made for manuscripts submitted for publication. Contributions are welcome, as are comments and criticism. Address all correspondence to the Editor, DRIVER Magazine, HQ AFISC/SEDD, Norton AFB, CA 92409.
Distribution: One copy for every 9 members of USAF.
ATTENTION DEPT OF THE NAVY PERSONNEL: Address all queries concerning distribution to NAVSAFECEN, NAS NORFOLK, VA 23511, Attn: Safety Publications Dept. All other correspondence will be welcomed by the Editor.
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THE EDITOR SPEAKS

DOUBLE CLUTCH

AND A CHILD SHALL LEAD THEM

Every once in a great while somebody comes up with an inventive safety program that is NOT the result of a previous accident. Such is the case with a Detroit-area grocery chain.

Farmer Jack's Markets became involved with general public safety campaigns when they started running full-page newspaper ads and gave away 200,000 free bumper stickers. The bumper stickers read: I'm buckled up, are you?

However, it was the company's next campaign that got the most attention. They installed seat belts on 50 grocery carts at every one of their stores throughout southern Michigan. The belts not only keep the children safely in their riding seats, they also help develop a better attitude toward seat belt and safety seat usage.

To give their campaign that extra push, Farmer Jack's Markets also took free pictures for the parents of the children safely strapped into the carts.

A Farmer Jack's spokesman said the object was to educate the parents through the children.

Yet the biggest surprise for members of the media at the initial press conference was the answer to this question: "What injuries or lawsuits caused you to install the belts?" If you haven't guessed already, the answer was, "None."

It might be noted that Michigan is one of the numerous states with child safety seat legislation and may become the first state in this country to have a seat belt law. (See "Timely Topics" elsewhere in this issue.)

Safety experts have long felt that programs such as this and child safety seats would help raise the low belt usage rates in this country — given enough time. If nothing else, it is believed that children who have been buckled into safety seats and worn belts since infancy would grow up to be belt users.

Additionally, children often "bug" their parents with such logical questions as: If I have to wear a safety belt, why don't you?

Likewise, some thoughtful parents have come to realize that their children might survive an accident because of the use of a safety seat only to be orphans because they, themselves hadn't buckled up.

surprise! it's spring!

continued

Driving through an area that is completely flooded is a questionable undertaking. Besides the danger of wet brakes, there is the danger of finding a hidden hazard, such as a rut or pothole.

more dirty road spray than the windows. When it dries, this spray will severely limit the amount of light that is projected. So give them attention when you're washing the car, and perhaps keep some glass cleaner and paper towels in the car for quick cleanings at other times.

Wipers: While we're on the subject of "seeing," we'll tell you a few things about those neglected accessories, the windshield wipers. You should take good care of them because, like the guy says on the Australian vacation commercial, "You're gonna get wet." No avoiding it.

Good wipers will clear off your windshield so you can see. Old ones will smear the dirt around and leave streaks that you can't see through.

The blades on wipers are made of soft rubber that works to squeegee off the glass. When they get old from use and from the temperature changes they endure, they get hard, brittle and cracked. Then, they do as much harm as good. So replace them if they aren't supple anymore.

Washer: Because spring's water is not always clean, you need more than just the wipers. Your car's windshield washer system can keep dirt to a minimum. Make sure it is working properly and the nozzles are not clogged. Then make sure

safety IN THE RAIN

the reservoir under the hood is full. Water is okay, but much better is a mixture of water and the special windshield washing solution. The solution cuts through dirt more easily than plain water. You'll be using this system a lot in spring, when dirty water or road spray collects and dries on the glass.

Tires: Now we'll turn your attention to another often-neglected part of the car, the tires.

A lot of you try to save a few bucks by ignoring the tires. Some of you ignore them until the cord shows through and they fall apart. Not a good idea, and for more reasons than the fact that tires are illegal if they have less than one sixteenth of an inch of tread.

The prime reason for watching the tires' condition is safety. Bald or nearly bald tires don't handle well on wet surfaces. That's what the tread is for — wet surfaces. The tread allows water to chan-

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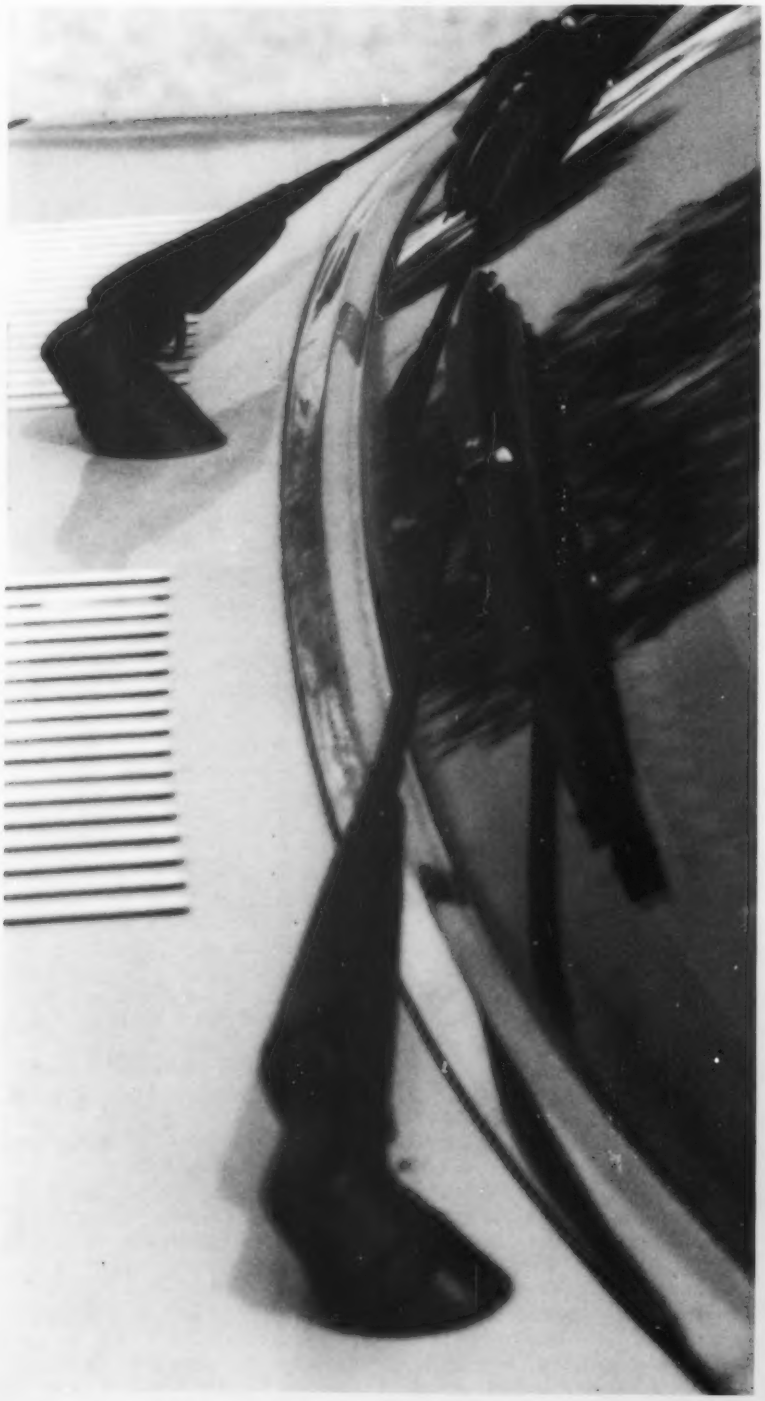

(left)
Pay attention to the condition of your car's wipers now. The heavy winter use they endured may have made them dry, cracked and brittle.

(below)
Mist like this will condense on your windows in foggy weather conditions. Keep your defroster going to keep the windows clear.

(right)
Running through deep water can wet down enough of the works under the hood to stall the engine. Go through slowly or go around, or you could have to get out and push.

nel through underneath the tires, rather than building up beneath and lifting the car off the road. (That's not science fiction, that's hydroplaning, a subject we'll skid through later.)

The more tread, the better. Check those tires and replace them if they aren't up to the job of wet weather driving.

Now that we've covered those major needs, we'll go on to look at the main enemy — water.

safety IN THE RAIN

Water, water everywhere . . . Spring surprises people with the appearance of water in many different forms. It may be snowing in the morning, foggy at midday with slush on the roads, and sunny in the afternoon with puddles everywhere. So it's best to be prepared for anything. If you like variety, you won't be disappointed.

Snow: Even though it's spring, winter hasn't totally given up yet. Occasionally there will be surprise snowstorms until it warms enough. These will usually be wet and slushy, although they can sometimes be as icy as December storms, especially early in the season.

As we told you last winter, your speed should be reasonable on this stuff. You're aware by now of the danger of skidding on ice and snow, but remember that springtime slush can be just as slick. Especially on hills, this wet slop can cause you to slide in directions you don't want to go.

Rain: The usual form your enemy takes in spring is the liquid one that falls from the sky. Rain collects in ruts and runs down streets. Rain reduces visibility and creates tricky driving conditions.

Basically, wetness reduces the friction of the tires against the road. It becomes more difficult for the car to move down the road without slipping and sliding. Therefore, on rain or any other wet surface — ice, snow, or slush — keep your speed down. The best speed for these conditions is a moderate one.

The wetter it gets, the more unsafe will be the speed limits posted on signs. Those limits are set for dry roads, and will be what is called "too fast for conditions" when rain is present.

When you're heading for a turn or a curve in the road, slow down before you reach it, to reduce the likelihood of losing control. Be cautious when you use the brakes. On wet roads it is best to "pump" the brakes, so your wheels don't lock up. Locked wheels provide no steering control at all.

Pumping the brakes involves applying moderate pressure to the brake pedal and then letting off, and repeating it again and again until the car is slowed to the desired speed (be it a complete stop or just slow enough for a turn). Regular braking involves applying maximum pressure at the start. Pumping the brakes involves increasing the pressure with each pump until the car is slowed, all the while keeping the wheels turning. Practice pumping the brakes on a dry, deserted road until you get the idea.

continued

Traffic: There are others out there who are trying to handle the wet weather, too. Give them a lot of room, more than you would normally. The danger of you, or one of them, skidding makes it wise to allow a larger space cushion around you. Watch them carefully in case they suddenly cut into your space.

Maintaining vision: Like we said earlier, rain reduces visibility. This is the time for the wipers and windshield washer. Be ready to reach for the wiper switch even when rain isn't falling. Passing motorists will often spray water and mist on you, and it will usually be dirty. A quick squirt of the washer will help clear this off.

Sometimes a passing car splashes enough water on your car to completely obscure your view of the road. At such times, ease off the accelerator until your wipers have a chance to clear the water away.

Puddles: After the rain, there are many puddles on the road, large ones and small. They can present some driving problems and even some dangers. Running through puddles might do no more than splash some dirty water on your fenders. But it depends on what is hidden under the water. A puddle can camouflage a pothole or a rut in the road. We'll mention potholes a little later. For now, just remember not to go too fast through puddles, just in case.

Often it is wise to go around puddles. There is enough water in some pools on the road to make the car skid. Some puddles will contain enough water and are deep enough to actually slow the car, if you drive through them fast enough. If you can't go around, go slow through a pool of standing water.

As you go through, take care to keep the car's brakes dry. Water on the brake pads/linings will make them partially or totally useless until they dry out. You can prevent wet brakes by applying the brakes slightly as you drive through a large pool. With your left foot, apply the brakes enough to keep the linings in contact with the drums (or pads with the disks). This will maintain enough friction to keep them dry.

Flood: One step up from puddles and large pools of water are roads that are completely flooded out. They are more dangerous, but the advice on them is simpler. Avoid them if at all possible. Go around by another road. You have no idea how deep the water is. Go through only if you are certain you can make it, but do it slowly, and keep the brakes in mind.

If the water is running across the road, don't try it at all. The current could wash you off the road and downstream.

Fog: Fog is perhaps the worst possible driving condition. Seeing in fog is like trying to see through a wad of cotton. Driving in it is almost like driving blindfolded.

Fog is a cloud that is near the ground, nothing more. It is a fine (or heavy) mist of water vapor that, depending on its density, is difficult if not impossible to see through. It can be like steam in a steam room.

Fog varies in density partly because it moves, and that makes it doubly dangerous. You could be driving along in light fog at 30 mph and suddenly move into an area where the visibility is reduced to nothing. Thirty mph then becomes dangerously fast.

Since you know that visibility will be so bad, you should be prepared for fog. Keep the windows as clean as you can. Fog is featureless and your vision doesn't like anything it can't penetrate. So your eyes will be drawn to any detail that looks like something, including smudges or dirt on the windshield.

Lights: Use your headlights in the fog to provide a little more illumination; they may help a little. If nothing else, the red taillights will show your position to anyone behind you.

However, don't use the high beams. Interestingly enough, your brights won't help in fog. The more powerful high beams are aimed higher, and they serve only to bounce off the water droplets in the fog. They cannot only dazzle oncom-

Be extremely careful about your following distance when driving in fog. Fog can thicken so quickly that your forward vision can be obscured, making driving dangerous.

ing motorists, making it more difficult for them to drive safely, the brights can also dazzle *you*. Due to the nature of fog, the light from the high beams will be reflected around and they will actually be less effective than the regular low beams.

Fog lights are the best kind of light for this kind of driving. They are aimed very low, and they are tinted to provide greater visibility. If you are being stationed in an area noted for fog during one season or another, consider installing fog lights as an accessory.

Dangers: The two greatest dangers in fog are losing your way and going off the road, and meeting other cars where they (or you) shouldn't be.

The first and unbreakable rule is to drive slow. The actual speed will depend on the extent of the fog. The worse the fog, the slower you go . . . and if it gets bad enough you get off the road completely.

Curves in the road appear very suddenly in fog. Signs may predict the curves, but be alert in case you miss a sign. You need more time to read the road markers and stripes so you don't, for instance, follow a line into a turn lane when the road goes straight.

Traffic lights don't shine as far in fog as in clear air, so watch carefully for them, too.

Beyond the regular road directions and markings, other cars will be an additional hazard. Some people will drive as fast in fog as they can when they can see. These people are, to be generous, foolhardy. Other people, not so used to fog or perhaps wiser than the speeders, will be moving very slowly. Take a cue from them — slower is better.

If the fog gets so bad that you can't see at all, like we said above, get completely off the road. Zero visibility is too dangerous for driving. When you move off the road, get as far off as you can and douse your lights. Another car following might see your taillights, figure the road is where you are, and hit you.

Hydroplaning: Top on the list of unpleasant wet weather surprises is hydroplaning. Remember we said earlier in this article that water could lift the car off the road? It's true.

If you're moving fast enough on a wet road, the water pressure can build up in

continued

safety IN THE RAIN

This is a road with a current of water flowing across it. The current could be strong enough to wash your car away. Some of the pavement could be eroded. It's just too dangerous to go across.

Potholes can have very sharp edges and they can be deep enough to severely damage the tires, the wheels, and even the chassis of the car.

Springtime snowstorms are likely to be more wet slop than ice. But don't be fooled — slush is a very slick covering on the road, and it can cause handling difficulties if you try to drive too fast on it.

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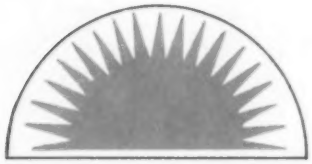

front of the tires sufficient to support the car's weight. This is extremely dangerous, as you can easily imagine, because contact with the road is partly or totally lost.

As we said, the tread permits water to escape from beneath the tires, so that contact is maintained with the road surface. If the tread is thin, hydroplaning is that much easier. Likewise, if the car's speed is too great, hydroplaning becomes more likely. The amount of air in the tires will also be a factor — underinflated tires are more prone to skidding.

Finally, the amount of water on the road affects the likelihood of hydroplaning. The more water, the worse the risk. This, of course, is out of your control.

Fortunately, the other three factors are all controllable by the driver. Keep tires with good tread on the car, and keep them properly inflated. Most importantly, drive slowly in wet weather, more slowly as the water increases.

Hydroplaning is extremely dangerous because you can be gliding along on a film of water without realizing it and then do several 360-degree turns when you try to change lanes. Watch your speedometer. If it says you're going faster than you think you are, you could be hydroplaning. Ease off the accelerator. When hydroplaning, it is important not to use the brakes and not to turn because either of these could cause you to lose control. When you slow enough so the speedometer and your road speed match, move along at a slower speed to avoid a recurrence of the hydroplaning.

Skidding: Somewhat less dangerous than total hydroplaning, but still too exciting for comfort, is a wet skid. This is where the car's wheels (usually the rear ones) get out of line and the car fishtails down the road. Skidding can be caused by too much speed or by too quick a maneuver or by over-enthusiastic use of brakes.

When a skid happens, keep your head. Ease off the gas pedal and steer the car toward the direction you want it to go. Steer lightly. Too energetic a countersteer can cause the car to skid in the opposite direction, and you want to avoid that. However, if the car skids the other way, just keep steering to straighten it out.

This is what you'd have to look through if your wipers didn't work. Do yours?

Don't use the brakes unless it's necessary. You can usually get out of a skid without braking. If you need to use them, however, do so lightly, and *pump* them, as we explain elsewhere in this article. *Do not* lock up the wheels or you could completely lose control of the car.

Potholes: Potholes are some of the surprise residue left behind by winter. They are damaged sections of road where the pavement has been crushed into a depression in the ground beneath. As more and more cars roll over them, the edges of the potholes get sharper and the holes themselves become deeper. They turn into more than an annoyance. They become a traffic hazard.

Potholes can damage tires and wheels, and if deep enough they can damage the chassis of the car as it rolls over them. So you should try to avoid them when you can.

Since potholes appear at the most heavily traveled part of the traffic lanes, they are sometimes hard to avoid. When you attempt to go around a pothole, be sure to stay within your own lane. You could collide with another car if you suddenly veered around a pothole and entered an adjacent lane. Of course, if the hole is too big or deep to risk going through, then you may have to wait until traffic leaves you enough space to get around it.

If you cannot avoid the hole for some reason, try to hit it as slowly as you can. This will minimize the danger of damaging the tires or other parts of the car.

Surprise! All of that should be enough variety to please even the most jaded driver. We'll repeat the most important pieces of advice in this article: Maintain your visibility and drive slowly through wetness, whatever form it takes.

safety IN THE RAIN

(above)
Driving on rain-slicked streets requires more attention to your speed and the space around you than in dry conditions.

(left)
Believe it or not, this is daytime. Stormclouds and rain can make it look like dusk or nighttime. Use your headlights.

(below)
If a car is moving fast enough to leave a wake like this, you'd be wise to keep well back. The spray will probably cover your car and leave you blinded until your wipers can clear off the glass.

ROUNDABOUTS

By WO2 D.J. McKinnon, Scots Guard
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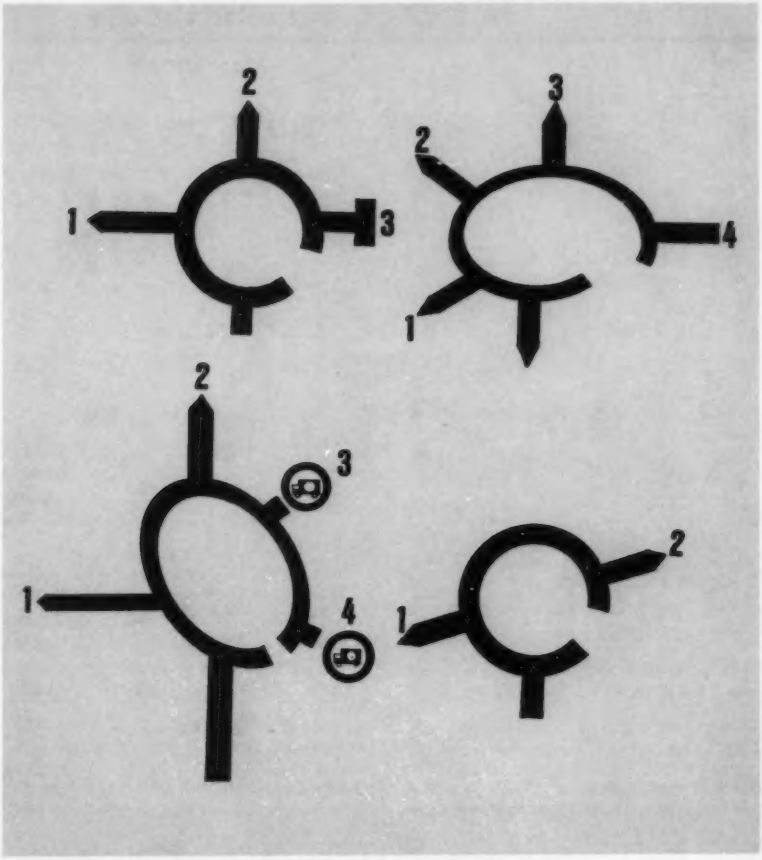
(EDITOR'S NOTE: For Americans driving overseas one of the hardest things to adapt to is driving on the opposite side of the road in some countries such as England. During a period of adjustment (and even after) situations such as traffic circles — known as roundabouts in England — can prove extremely confusing. To help you better understand roundabout maneuvering we're reprinting this article from the British Army equivalent of DRIVER, *Drive Alive*. Remember, this is about the United Kingdom only. Rules for the continent are different.)



Examples of numbering the exits clockwise from the entry point.

Hazard Drill (see side story) can be employed in the safe negotiation of roundabouts, a roundabout being nothing more than a junction albeit a complicated one.

There are of course differences discussed in detail later, in the negotiation of the hazard but the basic approach and preparation remain the same.

On seeing the roundabout warning sign, you must decide which route you wish to follow, then:

- **CHECK THE MIRROR**
- **SIGNAL YOUR INTENTION**
- **START THE MANOEUVRE**

As with ordinary junctions, you will be required to take up a suitable POSITION on the road, be it the appropriate lane or the left or right-hand-side of "your" half of the carriageway, you will need to adjust your SPEED in order that you can approach the roundabout at a safe speed which will allow you to "slot in" to a gap in the traffic on the roundabout and finally you have to look all around the hazard with particular emphasis on traffic approaching from the right on the roundabout and using your mirrors to monitor traffic movement around you.

The Highway Code in my opinion is archaic in its coverage of roundabouts. The concept of "Turning left, Going Forward or Turning right" is inadequate considering that the perfect cruciform roundabout is a rare beast indeed. Roundabouts can have two, three, four and more exits not necessarily at 90 degrees to each other. We have mini roundabouts and multi-mini roundabouts whose main contribution to road safety is the fact that because they are so complicated, motorists, intent on giving way to the right, never venture on to them. The result? No traffic movement — no accidents. Superb!

So! What is the alternative?

If we were to mentally number the exits from the roundabout in a clockwise direction from the entry point things would be simpler. (See example.)

Hence Exit number one would always be treated as a "Left turn" in the present terminology, Exit number two as "Going ahead," and any exit with a number higher than two, as a "Right turn." The exception to this would be a roundabout with two exits in which case they would be treated as a left or right turn.

On these pages you will find examples of the correct methods of approaching and negotiating roundabouts. The aim of imposing these drills on drivers is to reduce accidents by ensuring that through the use of a standard procedure confusion is eliminated.

NOTE: The examples shown assume only one or two approach lanes to the roundabouts and that all lanes are clear. For various reasons, it may be necessary to approach in a different position/lane from that shown.

continued

HAZARD DRILL

Hazard Drill is defined as a series of actions which when correctly applied will result in the vehicle being placed in the correct position on the road, traveling at the correct speed in the correct gear without prejudice to other road users.

You will notice that unlike drills involving weapons or marching soldiers there is no attempt to lay down rigid instructions to regulate every single movement made. This is because no two traffic situations are ever identical. They can vary with the date, the time and the volume of traffic, the presence of pedestrians, cyclists, parked vehicles and road works and of course the great British topic of conversation — the weather.

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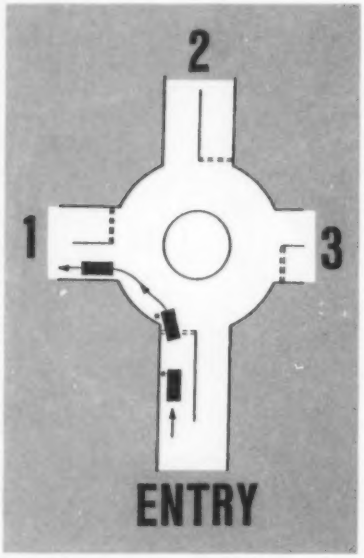
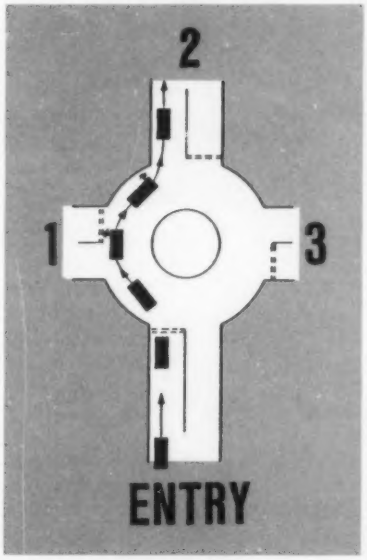
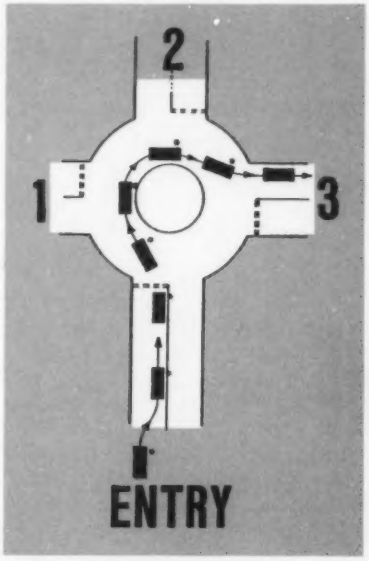


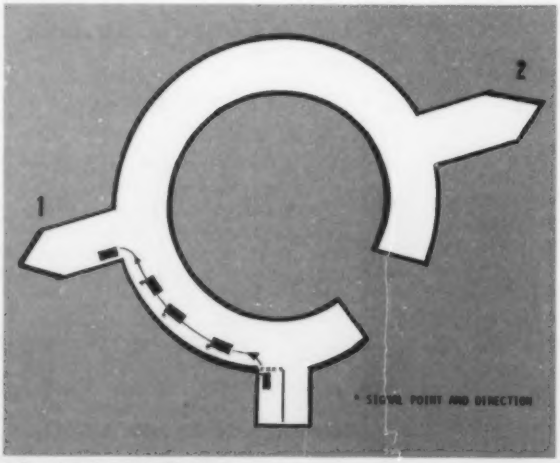
*Signal Point and Direction
LEAVING THE ROUNDABOUT BY EXIT NO. 1
APPROACH SIGNAL: Left hand indicator
POSITION: To the left of the carriageway or in the left-hand lane.
ON THE ROUNDABOUT: Remain in position to the left. Maintain the left hand signal until clear of hazard.
POINTS OF NOTE: Keep an eye on left-hand mirror for cyclists/motorcyclists on the approach.



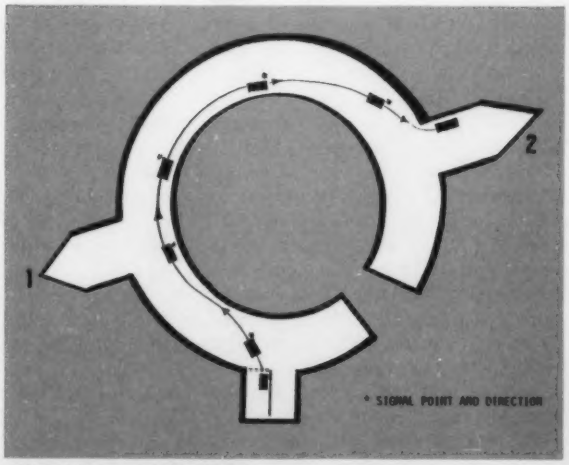
*Signal Point and Direction
LEAVING THE ROUNDABOUT BY EXIT NO. 2
APPROACH SIGNAL: None
POSITION: To the left of the carriageway or in the left-hand lane.
ON THE ROUNDABOUT: At the exit before the one by which you wish to leave the roundabout, signal left.
POINTS OF NOTE: Use of mirror prior to signalling and changing direction. Cyclist/motorcyclists on approach.



*Signal Point and Direction
LEAVING THE ROUNDABOUT BY EXIT NO. 3
APPROACH SIGNAL: Right-hand indicator
POSITION: To the right of the carriageway or in the right hand lane.
ON THE ROUNDABOUT: Remain in position to the right. At the exit before the one by which you wish to leave the roundabout change the indicator from right to left.
POINTS OF NOTE: Use of mirror prior to signalling and changing direction. Crossing two streams of traffic when entering the roundabout.



*Signal Point and Direction
LEAVING THE ROUNDABOUT BY EXIT NO. 1
APPROACH SIGNAL: Left-hand indicator
POSITION: To the left of the carriageway or in the left hand lane.
ON THE ROUNDABOUT: Remain in position to the left. Maintain the left-hand signal until clear of the hazard.
POINTS OF NOTE: Keep an eye on the left-hand mirror for cyclists/motorcyclists on the approach.



*Signal Point and Direction
LEAVING THE ROUNDABOUT BY EXIT NO. 2
APPROACH SIGNAL: Right hand indicator.
POSITION: To the right of the carriageway or in the right hand lane.
ON THE ROUNDABOUT: Remain in position to the right. At the exit before the one by which you wish to leave the roundabout change the indicator from right to left.
POINTS OF NOTE: Use of mirror prior to signaling and changing direction. Crossing two streams of traffic when entering the roundabout.

"This can't be happening to me..."

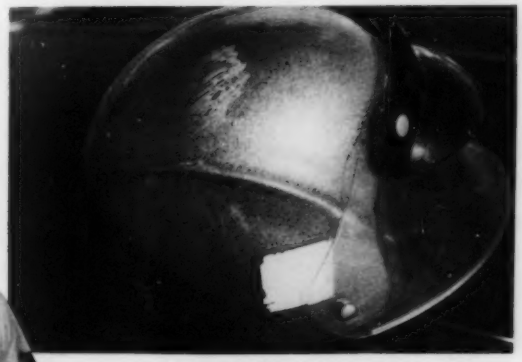
By MARY E. COBARRUVIAS, Safety specialist
Hq. San Antonio Air Logistics Center
Safety Office
Kelly AFB, Texas

He was sailing through the midnight breeze — but definitely *not* with the greatest of ease. The airman had just been rearended as he was traveling on his motorcycle down Highway 90 West. A motorist in a pickup truck, traveling at a speed well over 55 mph, apparently did not see the motorcycle in front of him and struck it with such force that the motorcyclist was knocked off and thrown from his vehicle.

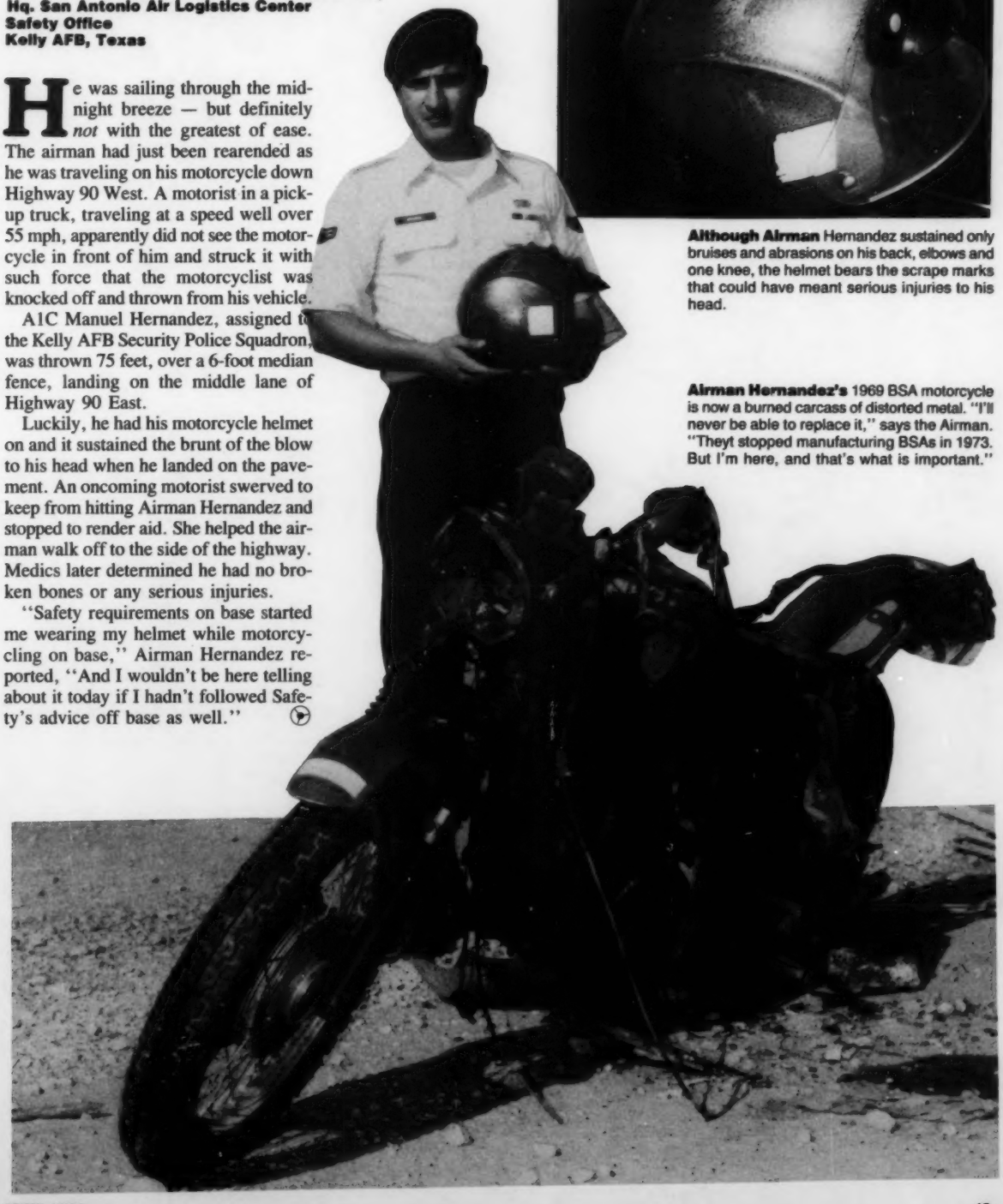
A1C Manuel Hernandez, assigned to the Kelly AFB Security Police Squadron, was thrown 75 feet, over a 6-foot median fence, landing on the middle lane of Highway 90 East.

Luckily, he had his motorcycle helmet on and it sustained the brunt of the blow to his head when he landed on the pavement. An oncoming motorist swerved to keep from hitting Airman Hernandez and stopped to render aid. She helped the airman walk off to the side of the highway. Medics later determined he had no broken bones or any serious injuries.

"Safety requirements on base started me wearing my helmet while motorcycling on base," Airman Hernandez reported, "And I wouldn't be here telling about it today if I hadn't followed Safety's advice off base as well."



Although Airman Hernandez sustained only bruises and abrasions on his back, elbows and one knee, the helmet bears the scrape marks that could have meant serious injuries to his head.



Airman Hernandez's 1969 BSA motorcycle is now a burned carcass of distorted metal. "I'll never be able to replace it," says the Airman. "Theyt stopped manufacturing BSAs in 1973. But I'm here, and that's what is important."

chariots OF FARR

MOTORMOUTH SHOWTELL HERE, FANS, SPEAKIN' AT YOU FROM THE SITE OF THE **MCMLXXXIV SPRING OLYMPICS**. THAT'S RIGHT, GUYS, THE STORM BEFORE THE LULL OF SUMMER IS WITH US ONCE AGAIN...

SPLASH SPLASH SPLASH SPLASH SPLASH

YOUR ELOQUENCE IS REMARKABLE, STREETCAR, AND WHILE OUR WORLD-WIDE AUDIENCE IS ENTHRALLED WITH YOUR VIVID DESCRIPTIONS, IT WOULD BEHOOVE US, I AM SURE, TO NOT ONLY VERBALIZE YOUR ANTICIPATED PERFORMANCE, BUT ALSO TO DEMONSTRATE HOW YOU WILL GO FROM ONE RESOUNDING DEFEAT TO ANOTHER. DO YOU AGREE? **EXCELLENT!** LET'S BEGIN BY ESTABLISHING HOW YOU'RE GOING TO SCREW-UP ON THE **GIANT DOWNHILL POTHOLE EVENT!**

POTHOLES! ONE O ON TO EVENT NUM **WET SKID.** TO FA MUST LOSE CONTA RIDE ABOVE IT AL THIS DANGER, STR UNDERINFLATED TA

WALL-L-

Y' LOSE THIS ONE WHEN Y' HIT THE POTHOLE... ...TEARS UP YER **TARS!**

BRAVO STREETCAR! ...AND YOU ALSO FAILED TO STAY IN YOUR LANE DURING YOUR FUTILE ATTEMPT TO AVOID HITTING THE POTHOLES!

WAY T'LOSE, MAN!

FARR'S FOURTH FAILURE WILL TAKE PLACE IN THE IN THIS EVENT, DUM-DUM WILL ATTACK THE FO IN THIS HAZARD AT A SPEED WHICH A SENSIBL ONLY CONSIDER ON A CLEAR DAY WHEN ONE C IF HE REMBERS TO TURN ON HIS HEADLIGHTS OF WHICH WOULD PERMIT OTHER FOG-ENSH TO SEE HIM, STREETCAR ALWAYS HITS THE ... DAZZLED EYEBALLS AND ANOTHER LAS

MY GUEST TODAY IS C.O."STREETCAR" FARR. STREETCAR'S THIS YEAR'S FAVORITE TO LOSE THE AUTO COMPETITION AND YOURS TRULY IS GONNA INTERVIEW THE BOOB.

STREETCAR, YOU'RE A DISGRACE, AS EVERYONE KNOWS, TO THE GRAND OLD PASTIME OF **AUTO-ING.** WOULD YOU BE SO KIND, SIR, AS TO ELUCIDATE ON HOW YOUR PARTICIPATION IN THE EVENTS WILL ENSURE, NOT A GOLD, SILVER OR BRONZE MEDAL WHICH, AS YOU DON'T KNOW, ARE AWARDED THE VICTORIOUS FIRST, SECOND AND THIRD PLACE GUYS, BUT INSTEAD, A HUNK OF PYRITE ON A STRING THAT WILL BE TIED AROUND YOUR NECK, PROCLAIMING TO THE WORLD **YOUR MISERABLE AND PREDICTED LAST PLACE FINISH!**

ONE OF THE SIGNS OF SPRING! BUT NUMBER TWO: **HYDROPLANING**, OR THE TO FAIL THIS EVENT, FARR'S CAR CONTACT WITH THE ROAD'S SURFACE AND IT ALL ON A FILM OF WATER. TO ACCOMPLISH STREETCAR WILL DRIVE TOO FAST ON ED TARS, **TIRES** THAT IS, WITH INADEQUATE TREAD.

MOVING RIGHT ALONG, STREETCAR WILL WIN THE **SOGGY BRAKES** LOSS BY SPLASHING THROUGH EVERY DEEP PUDDLE OF WATER HE ENCOUNTERS, THEREBY ENSURING THE WETTEST BRAKE LININGS THIS SIDE OF DOWNTOWN ATLANTIS. AS A RESULT, WHEN "CARS" HITS THE BRAKES TO AVOID BECOMING THE PARTY OF THE FIRST PART IN A TWO-PARTY COLLISION OR IN A ONE-CAR BASH FOR THAT MATTER HIS GRIP ON LAST PLACE IS ASSURED.

N THE TRICKY, THICKY **FOG.** HE FOG. HE WILL DRIVE NSIBLE DRIVER WOULD NE CAN SEE FOREVER. GHTS, THE LOW BEAM ENSHROUDED DRIVERS THE BRIGHTS. RESULT... R LAST PLACE FINISH.

STREETCAR, YOUR GAME PLAN WILL RESULT IN FINAL FAILURE IN THE **CROSS COUNTRY RAIN EVENT.** YOU'LL GO YOUR WRETCHED WAY, SINGING AND DING-A-LINGING IN THE RAIN, SQUINTING THROUGH A WINDSHIELD THAT'S SMEARED ON THE OUTSIDE AND MISTY ON THE INSIDE. SMEARED, I SUBMIT, BECAUSE YOUR WIPER BLADES ARE SHOT AND MISTY, SIR, BECAUSE YOU'RE TOO DUMB TO TURN ON THE DEFROSTER THING. YOU'LL FLOOD YOUR ENGINE ON FLOODED STREETS - **DOUBLE FLOODING - INTOLERABLE!** ON AND ON YOU'LL GO MISTAKES PILED ON TOP OF BLUNDERS! SPLASHING TO THE LOSER'S STAND TO CLAIM YOUR PALTRY PIECE OF PYRITE! I THINK IT'S DISGRACEFUL AND I THINK OUR VIEWERS WANT TO KNOW WHAT **YOU** THINK!

WALL-L-L...
I THINK YOU FORGOT T' MENTION HOW I DRIVE THROUGH MUD PUDDLES AND DRENCH, SOAK, IRRIGATE AND DILUTE PEOPLE WHO DON'T HAVE ENOUGH SENSE TO COME IN OUT OF THE RAIN ...
FAULKNER

For 1985 and beyond, full-size luxury cars are going to be much smaller outside yet just as safe, if not safer, inside than their predecessors.

Before you ask, "How can that be?", understand that none of the laws of physics have been altered. The larger a car is, the more energy it can absorb in a crash. And the more energy the car absorbs, the less that gets transferred to the belted passengers. Therefore, passengers in larger cars are less likely to be injured or, if they are injured, the injuries should be less.

smaller OUTSIDE SAFER INSIDE

What the engineers have done is made the full-size cars two feet shorter as well as narrower and lower. Yet the interior dimensions are within an inch or so of their forerunner's. It's in these spacious interiors that the engineers have found the ingredients necessary to make the new models safer.

The interior roominess of a full-size luxury car allows engineers to better control what happens to a passenger during an accident. Armed with increasing volumes of knowledge — and computer modeling programs — the engineers have rethought and redesigned everything

(above)
Although smaller and more aerodynamically designed, these 1985 models from Buick and Oldsmobile carry familiar styling touches that identify them as luxury full-size entries. Available as coupes and sedans, Buick's Electra and Park Avenue and Oldsmobile's Ninety-Eight Regency and Regency Brougham reduced their weight and outside dimensions while retaining expected interior roominess.

(right and far right)
Much of the maximum interior room in the 1985 luxury cars from Buick and Oldsmobile is due to the front-wheel-drive configuration of the six-passenger cars. Computer-aided design also helped engineers position components in ways that allow for as much interior space and safety as possible.

from seating positions to impact points. The end result is cars they believe to be not only safer during crashes than their larger forerunners, but safer than their forerunner's even larger predecessors.

Because the new full-size cars are substantially smaller outside you really have to get inside to appreciate that they have retained their luxury touches. And once inside you have to drive them before you can fully comprehend that they have retained all the big-car feeling and precise driving control.

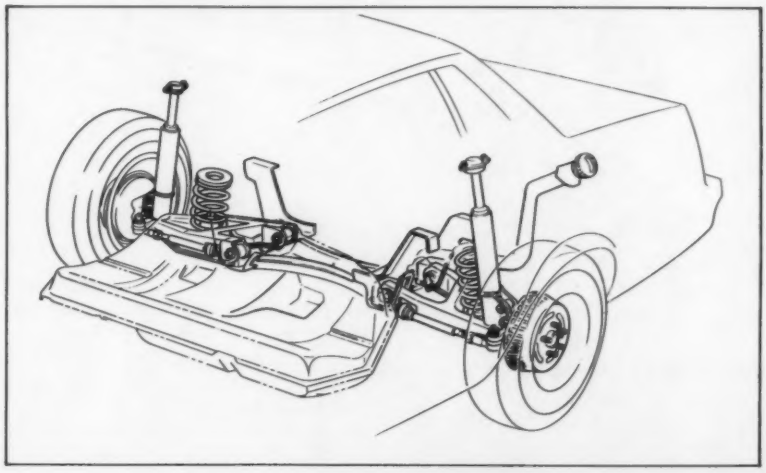
It is important when test driving a car that you intend to buy that you do so under conditions that duplicate the kind of driving you normally do. Not only should you drive the car over roads you normally navigate but you should do so with it loaded as you would have it in your day-to-day operations.

For example, a new front-wheel-drive car with a transverse-mounted V-6 engine coupled to a four-speed automatic transmission with overdrive responds differently under various loads. When carrying only front seat passengers the rear brakes might lock, making directional control difficult under extremely heavy braking. Yet, when fully laden, the same car has excellent brake response and stopping distances.

This is not an unusual situation because the Federal government standards require that a car perform its best braking while fully loaded. In addition, most manufacturers design brakes to be at their best when slowing a car at the rate of 26 feet per second squared, which is a European standard. When braking action exceeds this limit — which is very possible under emergency conditions — the rear brakes can lock before the fronts.

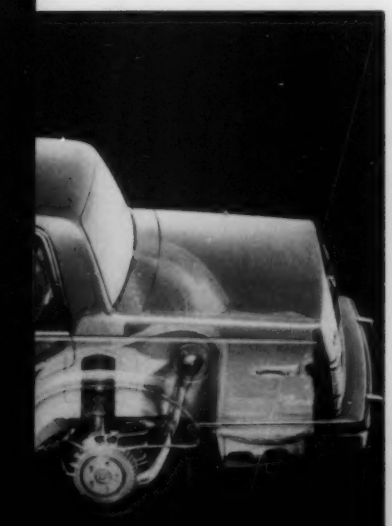
For these reasons all manufacturers are looking at anti-lock systems as well as sensing proportioning valves between the front and rear brakes.

Granted, a short test drive off a new car dealer's lot is not enough to judge the performance of any vehicle. Perhaps the best solution is to rent a similar vehicle and see if it really meets your family's needs and delivers that EPA comparison 19 to 25 mpg city and 34 to 41 mpg highway.



(above)
Independent rear suspension on the new luxury Buicks and Oldsmobiles enhances ride, reducing road and tire disturbances and improves braking on rough roads. However, there is a real safety feature in this cut-away view and that's the gas tank's forward mounting.

(right)
It's Important to test drive any car in your normal driving environment before buying.



Timely Topics

GSA TO BUY AIR-BAG FORDS

Automotive News reports that Ford Motor Co. and the General Services Administration (GSA) have settled on $35 million as the price for a 1985 fleet of 5,000 air-bag-equipped Ford Tempos. The cars will include a driver side air bag housed on a non-tilt, stepped, four-spoke steering wheel.

Half of the fleet cars will be equipped with anti-lacerative windshields, coated with an extra sheet of clear plastic bonded to the inner surface. High mounted center stop lights will also be fitted on the cars, which are equipped with Ford's standard 5-MPH bumper system. Electronic crash sensors will be used. The government Tempos will have automatic transmission and air conditioning.

Both GSA and NHTSA said the government purchased the air-bagged vehicles to test the system on a large group of cars and to assist the marketplace in making better safety equipment available to the public.

MICHIGAN SEAT BELT LAW

By the time you read this, Michigan may be the first state to enact a mandatory seat belt use law. On the first of March, Michigan Secretary of State Richard H. Austin said a belt law was within two or three votes of passage.

"A 100-member coalition supported by 69 newspapers, two public opinion polls showing overwhelming public support and a pledge from auto insurance companies to reduce premiums by 20% will tip the balance in favor of passage of this measure," Austin said at the SAE Congress & Exposition in Detroit.

SHOPPING FOR AUTOBODY REPAIRS

The best way to shop for autobody work is to actually look for an autobody shop before you need it, says the Automotive Information Council (AIC).

First get recommendations from people who have had bump work done. Also, shopping for minor cosmetic autobody work, such as small rust repairs, could clue you in on a good autobody shop you can use later on for more extensive autobody work.

Ask if the shop employs certified technicians in body repair, painting and refinishing. Look for certificates indicating that technicians have taken recent autobody repair courses as well.

Talk to the shop owner and describe how you want the car to look. Discuss options available to you. If you own an older car, you may just want minimal repairs to return the car to safe running order. Restoring an eight-year-old car to showroom condition may not be in your pocketbook's best interest.

Ask whether used parts will be utilized to repair the vehicle. They are generally less expensive and can save money on your repair bill.

Find out what kind of guarantee is offered against defects. If you can't get a written estimate, keep on looking.

Look for newer equipment used in pulling, aligning and measuring car bodies. If you don't know what a particular piece of equipment is for, ask the owner. If he's recently invested money in new equipment, he'll probably be glad to explain what he has in his shop. Don't expect hospital cleanliness in the garage area. However, if you don't like the looks of a shop, keep on looking until you find an autobody repair shop that meets your satisfaction.

By shopping around you'll be assured of quality workmanship at reasonable prices, says AIC.

OVERCROWDING THE JAILS?

Can there be such a thing as a drunken driving law that's too tough? Apparently so. Last year Arkansas adodpted a law that fines first offenders $150 and sends them to jail for 24 hours automatically. It does not allow judges to reduce charges against anybody after a citation is issued. If a motorist fails the Breathalyzer test, it all happens automatically. On top of a night in jail and an automatic fine, Arkansas drivers caught with a blood-alcohol content of .10 percent lost their driver's licenses for 90 days, have to complete an alcohol education program and must do public service work or face jail time. Eight county judges have declared the law unconsittutional and the matter will now go before the state supreme court.

Thirty-eight other states passed anti-DWI laws last year. Seventeen are similar to Arkansas' and none has yet been overturned.

CARS versus TRUCKS

Just how well do cars make out when they're involved in collisions with trucks? Pretty badly, says the American Automobile Association. Of the 5540 persons killed in car-truck accidents in 1980 (14% of all automotive fatalities that year), 84% were occupants of the cars. Pickup trucks were involved in 54% of the car-truck collisions; for every pickup-truck occupant killed, 2.8 car occupants died. Tractor-trailer rigs, on the other hand, were involved in 32% of the fatal collisions, yet 33.5 car occupants died for each person killed in a tractor-trailer. The AAA claims that two out of three fatal car-truck accidents occur on two-lane, undivided rural roads.

CATALYSTS IN WEST GERMANY

West German automobile authorities have been authorized by the Transport Ministry to grant manufacturing licenses for automobiles with catalytic converters. As a result, autos fitted with converters will be granted road licenses before emission-control regulations take effect Jan. 1, 1986.

TRUE ACCIDENTS

Following are a few reports of accidents involving Air Force members. We have removed names and references to dates and places.

FATIGUE

Operator and passenger were trying to go over 900 miles from their base and back in a weekend. On the return trip, while traveling westbound on an interstate, their vehicle collided with a parked truck. Operator received fatal injuries, and passenger received minor injuries. Investigation showed that: While in the right lane of the westbound interstate, vehicle (van) drifted to the left, into the lane that was closed for roadwork. The lane was closed from approximately 500 feet behind a tanker truck in the left lane. Witnesses stated that vehicle missed the last of 11 reflective barricades, positioned 77 feet from the rear of the tanker truck, and began spinning to the right. Van, after turning sideways, started to roll an undetermined number of times. During these rolls, the operator was ejected and received fatal injuries. His body came to rest in the right lane, eight feet from the van, one foot from the edge of the right lane. The passenger, asleep in the rear of the van, remained in the vehicle. Van came to rest on its wheels, after striking another piece of equipment in the left lane. Neither occupant used seat belts. Drugs or alcohol were not a factor. Mishap factors: poor judgement — exceeding physical limitations by trying to drive too far in too short a time; fatigue; unsafe act — failure to use seat belts/harness.

SPEED IN ALLEY

At approximately 2045 hours, member was alone, driving his motorcycle without a helmet through an unnamed alley in town at a high rate of speed. When the member crossed a street he ran broadside into a car that was traveling at a high rate of speed down that street. The member was thrown over the car for approximately 50 feet and landed on his head. Member was initially taken to a hospital in the city and then transferred to another hospital due to massive head injuries sustained in the accident. Member was placed on a ventilator the next morning and remained on the ventilator. Member remained in critical condition without regaining consciousness until he was pronounced dead by the attending physician at 2232 hours three days later.

SNEEZE

Airman was a passenger in a POV driven by her spouse, operator number one, traveling eastbound on a highway. A vehicle driven by operator number two, traveling westbound on the highway, went out of control when operator number two sneezed and swerved into the eastbound lane. Operator number one went into the westbound land to avoid hitting operator number two's vehicle. Operator number two went back to the westbound lane and then had a head-on collision. Airman was pronounced dead at the scene of the accident at 1130 hours by the coroner.

ALCOHOL

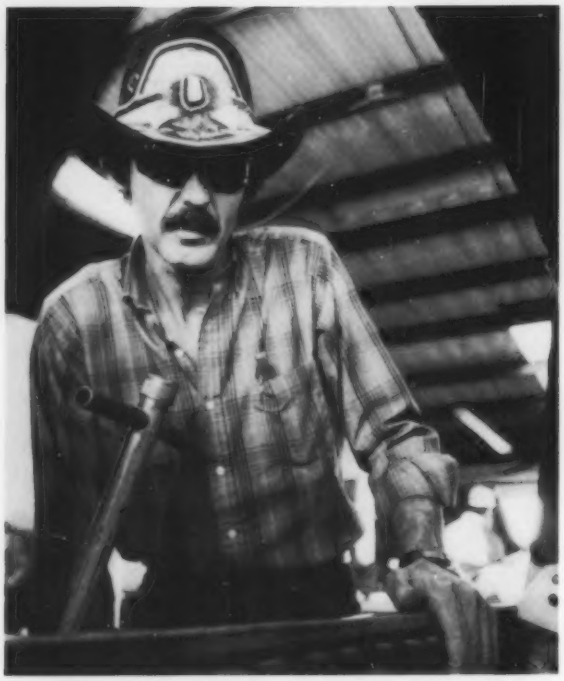
Operator one performed day shift charge of quarters (CQ) duties from 0800 to 1600 and after duty remained at the dormitory. He was seen taking a nap by his roommate after CQ duties. According to a witness, operator one and passengers one and two voiced their intent "to get something to drink" and to cruise (drive up and down) a boulevard. No further information could be obtained about the activities of operator one nor of passengers one and two prior to 2030. They were later seen by a witness at a store at approximately 2030. Another witness stated that at approximately 0130 operator one and passenger one were drinking beer and whiskey and that they were going to look for the drag strip. He also indicated that operator one was a moderate to heavy drinker. At approximately 0304, vehicle one was traveling north on a road with a posted speed limit of 45 mph. Operator one's speed was estimated at 65-plus mph. Operator one failed to stop at a stop sign at the intersection of the road and a boulevard. Vehicle one struck vehicle two, which was traveling west on the boulevard. There were no skid marks or other evidence of evasive action by either vehicle. Operator one and passenger one were killed instantly. Passenger two was transported to the hospital and was pronounced dead on arrival (DOA). Operator one had a Blood Alcohol Content (BAC) of .18, passenger one had a BAC of .22, and passenger two a BAC of .01. Occupants of vehicle one were not wearing seat belts. Operator two had also been drinking, but a BAC is not available. Operator two sustained injuries to head and lost some teeth. His passenger received a broken hand and collar bone.

ALCOHOL (AGAIN)

Operator had worked until 1615. He left the equipment shop with several shop personnel to attend a farewell party for one of his friends at the NCO club. Operator's supervisor also attended the party and stated that operator drank no alcoholic beverages while he was present. The supervisor left at approximately 1830 hours and stated the party was beginning to break up. Operator had been briefed by a superior not to drink alcohol due to the fact that he (operator) was on call throughout the night.

At approximately 2000 hrs. operator was observed at ballfield number one watching his squadron play softball. Witnesses state they did not observe operator drink any alcohol nor did they smell the odor of alcohol on him. Operator left the softball field at 2030 hours with a passenger on the rear of his motorcycle. Operator let the passenger off before the mishap occurred.

At approximately 2050 hours while traveling south on a highway, operator was clocked by a policeman going 58 mph in a 35 mph zone. Operator, upon seeing the policeman, speeded up and proceeded out of the city limits and struck the rear of a tractor trailer traveling south on the highway. Operator and his motorcycle slid under the trailer and were dragged 124 feet down the highway. Operator received critical head and internal injuries. Operator was treated at the scene, transported to a hospital, and then to another hospital. At the second hospital a Blood Alcohol Test was performed which registered .127. Operator expired three days later due to respiratory failure.



YOU'RE SAFER TODAY

According to the winningest stock car racer ever, Richard Petty, you're saver in your street car today than he was in his specially built racer 15 years ago.

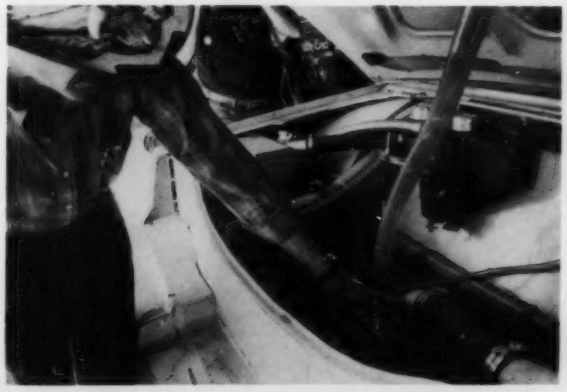
(left)
When you look inside Petty's race car with all its roll cage bracing you can readily understand why a stock car driver can survive a 150-mph crash.

(below, left)
However, King Richard says the real key to accident survival on the race track or on the street is safety belts.

(below, right)
Fifteen years ago with only lap seat belts, race drivers flopped around inside crashing race cars and got hurt. Today, with the addition of shoulder harnesses, there is little chance of the driver hitting anything inside the car. The same is true of today's passenger cars.

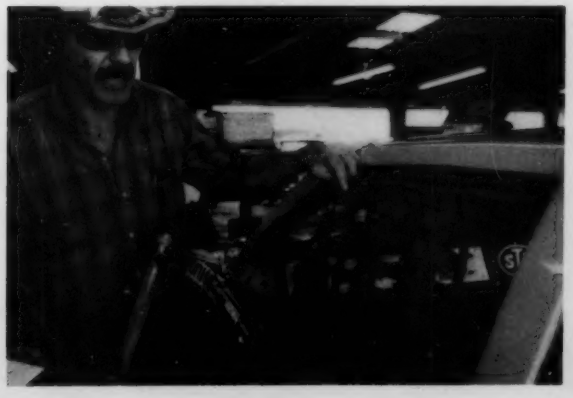
While Petty's National Association for Stock Car Auto Racing STP Pontiac may look like your everyday sedan it has been completely rebuilt to take the punishment of a 150-mph crash.

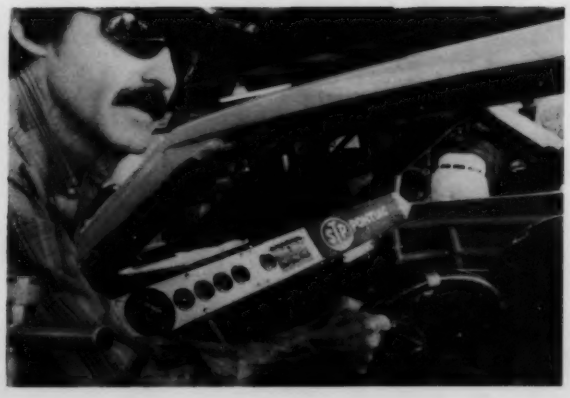
(right)
The risk of fire in a race car is greatly reduced by special fuel cells, one-way safety valves and additional bracing. On your car, the fuel tank has probably been located ahead of the rear axle to keep it out of harm's way in case of an accident.



(below, left)
Window nets keep racers' heads inside the protective area of the roll cage, adding to the safety provided by helmets.

(below, right)
After an accident, the steering wheel is a quick remove type to help rescuers aid the driver.





LOOK FOR them

It's a common everyday occurrence. It happens on the expressway. It happens at intersections. It happens when pulling out of a driveway. You just don't see the motorcycle.

They're there. They have every right to be there. But you don't remember to look for them.

Sure, they're smaller than a car. They're difficult to spot in traffic. And it is harder to judge their speed. But the real problem is you just aren't looking.

And the motorcyclists feel that you're out to get them. How could you not see them? They had their headlight on. You must have seen it. They were wearing bright colors. You must have seen them. How could you not see them? But you went ahead and violated their space anyway.

Motorcyclists really feel vulnerable. They're exposed to all the elements. For self-preservation they have helmets, eye protection, boots, gloves and durable clothing. But these aren't much when compared to all that heavy metal your car or truck has.

All that's necessary is respect. Respect motorcyclists as fellow drivers. Share the roadway with them.

If nothing else, you have to respect motorcyclists for their abilities to handle their machines. For instance, motorcyclists have to use hands to operate the throttle, clutch, front brake, turn signals, light switches and horn, in addition to maintaining balance and steering control. That's a lot, especially when some car drivers can't even manage to operate the turn signals while gripping the power steering wheel.

Probably the greatest disrespect between vehicles occurs at intersections. Almost 40 percent of motorcycle accidents involving another vehicle happen at intersections. And the four-wheeled vehicle was at fault in almost 70 percent of these accidents, while the four-wheeler and two-wheeler shared the blame in two percent.

The primary error: failure to yield right of way. On the four-wheel side this accounts for 89 percent of the accidents. For motorcycles it's 49 percent.

It should be clear that you should always be prepared to yield the right of

Some motorcyclists get more respect than others, but even motorized police officers often feel that they are invisible to other traffic.

way to oncoming traffic. That small gap in oncoming traffic that you were planning on turning in may contain a motorcycle. Or there may be a motorcycle planning on turning in out of oncoming traffic. Check traffic on the right. Check traffic on the left. Check oncoming traffic. Slow down and double check the traffic.

If the intersection has traffic lights, be extra careful of traffic going through on a yellow light, or the individual who wants to make that quick left turn in front of you.

And remember there are other types of intersections such as driveways, alleys, traffic circles, entrance and exit ramps.

Another major area where motorists and motorcyclists fail to show respect for one another is in the following distance. If a motorcyclist is following you too close, provide him or her with the normal signals: flash your brake lights; slow down and allow the motorcyclist to pass (safely); or accelerate. On the other hand, if you are following a motorcycle and get these same signals, take the hint. The motorcyclist may even wave at you to back off or go around.

If you're having trouble judging your following distance, just remember the two-second rule. Pick a fixed point ahead of the leading vehicle. The point can be a shadow, pavement marking, sign, etc. Once the lead vehicle has passed the point, count two seconds (one thousand one, one thousand two). If you pass the point before the two seconds are up, you're too close.

Passing requires a great deal of respect between motorists and motorcyclists. The important considerations are: being seen by the other vehicle operator, and having enough time and space to make the maneuver safely. Proper signals are a must. Communicating with other vehicles can prevent critical situations from developing. Whether passing or being passed, use the mirrors and look ahead to keep aware of changing traffic conditions.

Remember, even though a motorcycle is smaller than a car, the cyclist is still entitled to a full lane. If you're being passed, maintain your lane position and speed. Speeding up while being passed is improper and dangerous.

When passing a motorcyclist your windstream can create buffeting that may cause the cyclist to wobble or lose control. Again, allow the cyclist a full lane. And avoid returning to the original lane too soon — a cyclist is extremely vulnerable when forced right or off the road.

Of course, part of passing is lane changing and that presents a problem in itself. Often your car's blind spot hides a motorcycle. Outside rearview mirrors are not enough. When changing lanes it is good policy to take a quick glance over your shoulder. Be alert for the presence of a motorcyclist on the outer edge of your traffic lane, especially on turns.

With the ever increasing numbers of motorcycles on the road, you should be expecting one to appear in traffic at any time. As a rule, motorcyclists ride in the left third (left wheel track) of a lane. This position enables them to have a better view of traffic and the road as well as making them more visible to you.

Another area that falls into the realm of disrespect comes when misinterpreting a cycle rider's intentions. Noting the motorcyclist's lane position is a key to the rider's next maneuver. But remember that motorcycle turn signals are not self cancelling like those on cars, so they may remain on even after a maneuver has been completed.

Perhaps one of the most misunderstood areas between motorcyclists and non-riders is road hazards. Minor problems for four-wheeled vehicles such as potholes and railroad tracks can be major hazards for two-wheeled vehicles. Potholes, railroad tracks, oil slicks, gravel and sand, puddles, road debris, ruts and other hazards may require sudden lane position changes as well as directional changes for a motorcyclist.

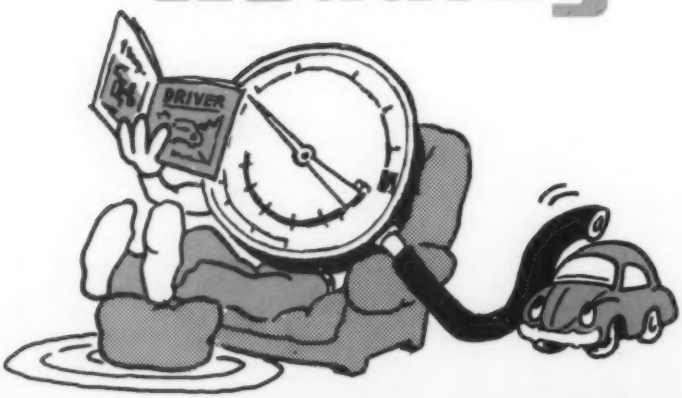
Sand, mud and water make starting and stopping a motorcycle more difficult. Loose gravel and other quick-spill materials force the cyclist to ride with extreme caution. Even wet paint stripes can alter the direction and speed of a motorcycle.

The four-wheeled driver must be aware of how the motorcyclist "sets up" when encountering such hazards, expecting the rider to make sudden changes in position and direction. For example, when crossing railroad tracks, the motorcyclist will adjust the cycle's position to cross the tracks at close to a 90-degree angle. This is done to prevent a sudden loss of traction and control.

An attitude that is respectful of all other drivers including motorcyclists can be a significant factor in driving safety for everybody. Cooperation in traffic is essential. By operating your vehicle according to the laws, with courtesy and common sense, we can *all* live on the roads together.

Four-wheel drivers failing to yield right of way account for the majority of motorcycle versus car/truck accidents at intersections.

Vacuum Reading



In these days of multi-thousand-dollar electronic test equipment it is reassuring to know that there is still a $10 instrument that can help the backyard mechanic diagnose more than 30 different engine problems — the vacuum gauge. This top-notch trouble-shooter is quick to diagnose anything from sticking valves to poor rings, including bad carburetor adjustments and a leaky head gasket.

For the economy-minded motorist, the vacuum gauge can squeeze more mileage out of every gasoline drop than a politician can get from a campaign promise. In addition, the gauge can be employed to check the positive crankcase ventilation valve and system — a big plus for ecology.

If this sounds like a lot to expect from such a simple, inexpensive device, it is not. Especially when considering that vacuum is essential to engine operations.

Vacuum gauges are top-notch trouble-shooters that can diagnose more than 30 different engine problems, yet cost only about $10.

The best source for vacuum readings is directly into the intake manifold.

The vacuum is created by each cylinder as the piston goes down on its intake stroke. When the intake valve opens, drawing a fresh fuel charge from the intake manifold, a vacuum is created in the manifold. When the engine is operating properly, there is a steady, constant vacuum at idle, as each cylinder smoothly and efficiently draws its fuel charge. But any malfunction or misadjustment which affects engine efficiency also alters this vacuum. Since specific engine problems affect manifold vacuum in certain ways, a vacuum gauge can be used to accurately diagnose the condition of an engine by measuring the amount and condition of vacuum.

To provide this measure and condition report, the vacuum gauge must be hooked up correctly. You can't just pull a vacuum line and attach the instrument. Accurate, reliable readings can be obtained only from primary manifold vacuum sources. For best results follow the gauge manufacturer's recommendations — you know, "When all else fails, read the instructions."

On older vehicles with vacuum-operated windshield wipers, remove the wiper system vacuum hose at the intake manifold and attach the gauge hose. Many vehicles have a threaded plug in the manifold that can be removed and a special fitting installed. This fitting is usually supplied with the gauge, although parts suppliers can provide them when they aren't or when a different size is needed. If there isn't a plug in the manifold, then install a T-fitting in the vacuum line to the power brake unit or vacuum assist on disk brake-equipped cars.

For best results, always attach the gauge as close to the vacuum source as possible.

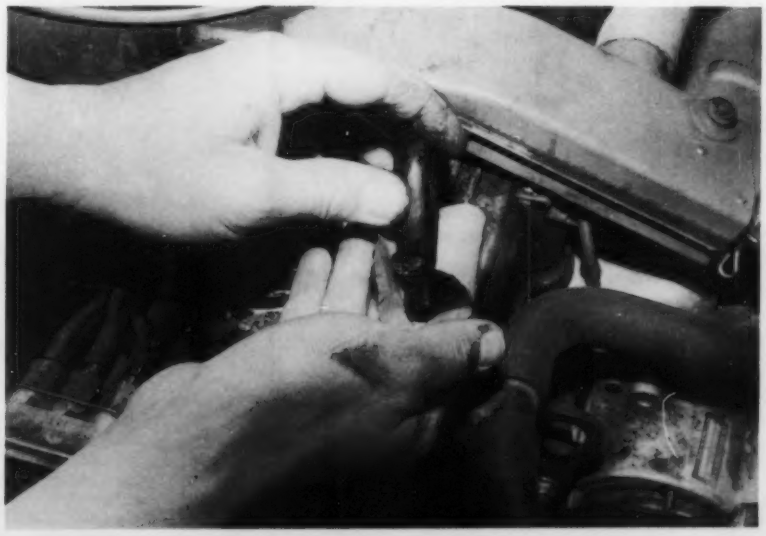
First, do a cranking vacuum test. After starting the engine and warming it to normal operating temperature, shut it down. Remove the high-tension coil lead from the distributor cap and connect it to a good ground. Remove the air filter. Back out (turn counter-clockwise) the idle speed screw until the throttle plate closes tightly. If the carburetor is old enough to still have idle speed air screws, turn them in until they bottom or hit the limiter caps. Remember, when turning any adjusting screws, count the number of turns so that they can be returned to original positions. If your carburetor has an anti-dieseling solenoid, disconnect it. Remove the PCV valve at the engine rocker arm or push rod cover, and plug it with tape.

Cranking the engine will give you an easy engine diagnosis in inches of mercury. The healthy emission-controlled engine will give a steady reading of 4 units or more, while the non-emission-controlled (pre-1968) engine will read at a steady 10 units or more. While readings may vary considerably between power plants, they should not fall below these minimums.

An excessively low vacuum reading that is steady is caused by a condition that affects all cylinders equally. Numerous causes for this include: a carburetor flange gasket that is leaking; a worn carburetor throttle shaft; leaking vacuum lines; improper valve timing, or a slow cranking engine. The slow engine cranking can be due to a run-down battery, excessive resistance in the battery cable connections, a defective starter or ex-

continued

When doing the initial cranking test, remove and ground the high-tension coil lead after warming the engine up to operating temperature.



For the first part of a cranking test, the PCV valve is removed and plugged. Later you will unplug it to check its operation.

cessive mechanical drag from tight-fitting pistons in a recently rebuilt engine or oil thickened by excessive oxidation.

While even pulsing is normal for 6- and 4-cylinder engines, uneven pulses indicate a leaky condition that is not affecting all the cylinders. Such conditions include: burned or stuck valves; an intake manifold leak at one cylinder; worn intake valve guides, or a broken piston or ring.

Now remove the tape covering the PCV valve. If it is operating properly the vacuum will drop to about half its original value. If it drops to less than one-half, there is excessive flow which may upset the air/fuel ratio, causing rough idling or even burned valves. No change indicates a clogged PCV valve.

OK, put everything back the way it was before you started the cranking test. This includes returning the idle screw to its original position, replacing the coil high tension wire, reconnecting the anti-dieseling solenoid, reinstalling hoses and vacuum lines, and putting the PCV valve back into the PCV system.

With the engine warmed to operating temperature, set the idle to specifications. The idle must be correct since open throttle plates drop the vacuum, affecting the accuracy of the reading. With the engine running at idle you have an instantaneous engine evaluation.

Again, the healthy engine will give a steady, constant reading. However, as the engine is running, the reading should be between 17 and 22 units, although some newer 4- and 6-cylinder models deliver acceptable performance at 15 inches. Also, a slight flicker of the needle can be expected with high-performance engines. There is a drop of one inch for each 1,000 feet above sea level.

The engine that gives a steady vacuum at idle, with the needle dropping toward zero and jumping back past 20 when the throttle is opened and closed quickly, is in good condition. Anything else spells trouble.

If the needle swings back and forth slowly, the engine is speeding up and slowing down. The carburetor is probably causing this although air leaks might be indicated.

After checking the carburetor base gasket, tighten all the nuts holding the carburetor to the manifold and manifold to the engine block. Now turn the low-speed mixture adjusting screws in (clockwise) until the gauge reaches the highest obtainable value. If the needle still swings, look higher in the system. If the air cleaner isn't clogged, bend the float level down 1/16 inch. Still no improvement? Has the carburetor served 30,000 to 40,000 miles or more? If so, it's time to look into a new or rebuilt

For cranking tests the air filter must be removed and the idle speed screw backed out until the throttle plate closes tightly.

SAFETY FIRST

- Set the parking brake. Put the transmission in neutral or, on automatics, park. Chock the wheels.
- Always operate the vehicle in a well-ventilated area to avoid carbon monoxide asphyxiation. If the area can't be ventilated, route the exhaust gases outside via a leak-proof exhaust hose.
- Keep hands, hair, neckties, loose clothing and test leads well away from fan blades, fan belt, power steering belt, air conditioner belt and other moving parts.
- Don't touch hot exhaust manifolds, radiator, or high-voltage spark plug and coil terminals.
- Never look into a carburetor throat while the engine is being cranked or running. Sudden backfires cause burns.
- Don't smoke or allow flame or spark to occur near carburetor, fuel line, fuel filter, fuel pump, spilled gasoline, cleaning solvents and other flammables.
- Never use gasoline as a cleaning solvent.
- Keep a fire extinguisher rated for gasoline and electrical fires handy.

model.

Is the needle reading steady, but below acceptable ranges? This means the throttle is open wider than necessary. Why? Is the engine new and stiff? Maybe it isn't completely warmed and the oil is thick. Maybe the ignition timing is late. Or the valve and ignition timing are late as the result of worn timing gears or timing chain.

Leaking intake valve, burned distributor contact points, blown head gasket or a totally dead cylinder will cause considerable pulsation at a steady rate.

Now open and close the throttle suddenly. If the needle dropped to zero and then shot up between 20 and 22, chances are you need new rings.

A pointer which sweeps or wanders erratically through several inches indicates a malfunction affecting all cylinders unequally and inconsistently. To help isolate the trouble, run the engine at about 2,000 rpm. If the pointer steadies, check ignition and timing, then carburetor mixture adjustment. Should the sweeps get larger, check for weak or broken valve springs. Shorter and more rapid sweeps call for an induction system leak check or even checking for sticky valves.

If the reading is very low, advance the timing.

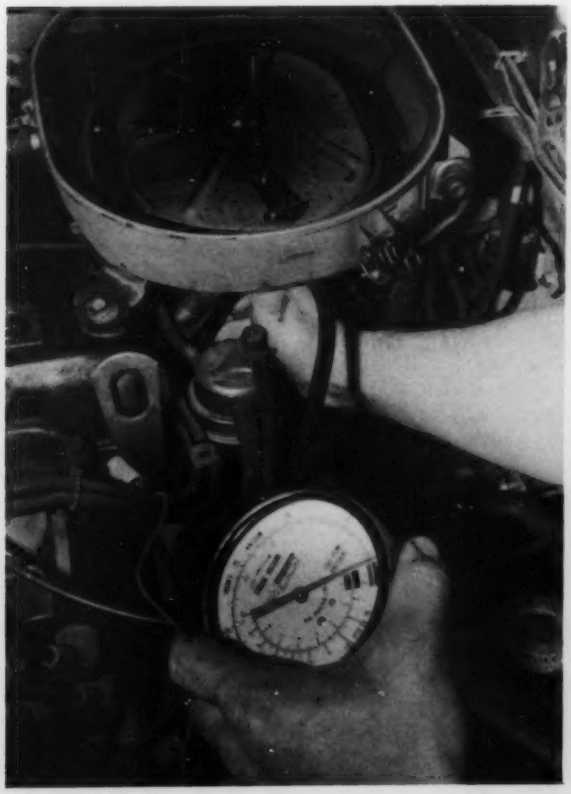
Is the vacuum gauge oscillating in a range of one or two points? Could be the spark plug gaps are too close.

If you run the engine at a steady 2,000 rpm and the gauge gradually reduces to almost zero and begins to climb slowly, you may have an exhaust system restriction.

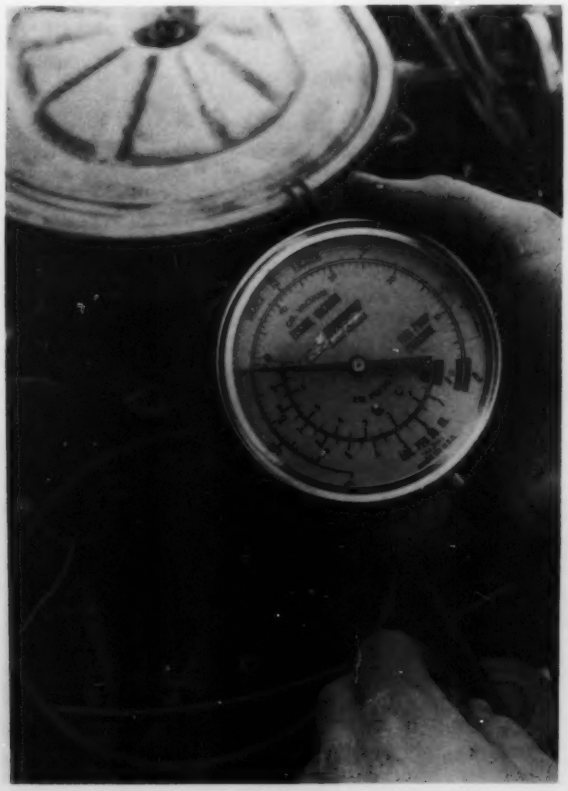
Although it is an excellent diagnostic tool, especially when used in conjunction with a compression gauge, the vacuum gauge's real value comes with more frequent use. By making regular vacuum checks you can spot developing problems and correct them before they become major disasters.

The best way to keep constant tabs on the engine's performance is to install a permanent dash-mounted vacuum gauge. These are often sold at auto supply and discount stores as "motor monitors." Since they are usually calibrated in fuel economy ranges, they will help get the most out of every drop of fuel as well as give you a complete engine analysis at a glance. Fuel economy ranges relate to throttle plate openings. The higher the vacuum reading, the narrower the throttle plate opening, therefore the higher the fuel economy.

While the vacuum gauge can't remedy the faults it finds, it does simplify the job. It can save you money, contribute to a better environment and delivery the peace of mind you get with a smooth running, efficient vehicle.



Attach the vacuum gauge as close to the vacuum source as possible.



A healthy engine will delivery a steady, constant reading of 17 to 22 inches.

BACKFIRE
LETTERS to the EDITOR

MISSING THE BOAT

I think a lot of people are missing the point about the "right" to decide for oneself. Granted, most aspects of one's life should be left to the individuals themselves . . . until their decision crosses paths with someone else's rights. This is where the line has to be drawn.

Let's take a look at seat belts, where do the rights conflict? Fact: Seat belts help you maintain control of your vehicle in an emergency situation. By staying in control you may be able to avoid a collision with someone else. Doesn't the "other person" have the "right" to not be exposed to an uncontrolled vehicle?

Why do we have laws against drinking and driving? Don't you and I have the right to get drunk? It's our body. Once you have the "privilege" of a drivers license, you then have a right to drive. Combine the "right" to get drunk and the "right" to drive and you now have the "right" to be a drunk driver. (What scares me is some people will agree with this insane logic.)

Back to seat belts. I feel that I have the "right" to drive on our roads knowing the other driver has a better chance of not hitting me because they are buckled in.

Now, helmets. No, you do not have the right to ride without a helmet, law or no law! (When you get over the desire to throttle me, please continue.) Fact: Helmets with full face protection prevent tearing (goggles prevent tearing but restrict vision). Obviously, tearing diminishes visibility. Fact: Helmets increase hearing by blocking wind noise. Now, tell me a person that can't see or hear well on a motorcycle is not a hazard to some degree.

The bottom line is we all have the "right" to subject ourselves to danger. We do not, under *any* circumstances, have a right to expose others to danger! Let's stop thinking of ourselves and think of others for a change.

I take exception to the comment in the article "What Is Eye Protection" stating, "Your personal preference for a face shield or goggles will determine which type of eye protection you wear." OK, goggles are better than sunglasses but are "vision" restrictive and full face shields are not.

TSgt. Warren L. Baynard, USAF
Peterson AFB, CO 80914

A SLIM WAGER

I just finished studying the February 84 edition of DRIVER, which I found very interesting and informative and would like to make a couple of comments:

1. In your article "Observing the Clues" on page seven, as far as the Trans Am going right or straight I definitely would not bet. However I might place a very slim wager on a *left* turn, but I wouldn't bet the farm on it.

2. On page 13, the picture of the cracked motorcycle helmet leaves me to question as to whether the deceased had the helmet fastened or was he wearing it with the chin strap flying merrily in the wind? Perhaps it was sitting on the back of the bike? Did the CHP remove it from the victim's head?

3. Having seen the end result of a couple of people kissing concrete, trees, etc., I can only say BRAVO ZULU to "Red" Dunningham in his letter on freedom of choice. Even though I do not ride a bike, as an EMT-1A in California I got tired of seeing the "end result" of a bike accident.

Keep up the excellent job you're doing.

SSgt Edwin S. Schmidt, ANG
Long Beach, CA 90805

The car was indeed signaling for a right turn, but the photo caught the signal between flashes. Sorry about the confusion. As to the helmet photo, the helmet was removed by the paramedics. It had been worn with the strap fastened.

ASBESTOS NOT STRESSED

While reading the Backyard Mechanic article on Rear Wheel Brakes in the December 1983 DRIVER Magazine, I found that a certain point was not stressed. Being in the Safety Department on board USS Constellation, I am constantly being confronted with problems concerning asbestos.

Your article makes one statement about being careful not to breathe the dust. The fact that the dust is asbestos and that asbestos is a 30-year time bomb that kills you in the end is not mentioned. Several people have stopped by the Safety Department asking about this. Most people would respond with an "oh a little dust won't hurt me." At a minimal, one working on brakes should use a dust mask.

What I am asking is that in the future, when you talk about brakes I think it would be beneficial to talk about the dust being an asbestos dust which can kill and how to prevent it.

MM1 D.A. Hudson, USN
FPO San Francisco, CA 96635

You are so right! The industry is working on brakes without asbestos but, even if they come up with something soon, a total changeover is years away. Meantime, proper precaution is essential.

OVERCONFIDENT

We here at the MP School Vilseck, FRG, read your excellent magazine. I recently had a motorcycle accident which I would like to submit to your "How It

Happens'' section in the hope that someone else may learn from my mistakes.

I've been riding motorcycles for about 18 years and considered myself a good driver. I'd been assigned to Germany and looked forward to the high speeds of the autobahns which I grew up with in the states before the 55 mph restriction. Having been in Germany for two years, I'd become very comfortable with the European style of riding, light and fast. Fact is, I had become overconfident.

It was the dead of winter, snow on the ground, temps in the high 20s and the road seemed clear, having had three days of bright sunshine. I got with two other friends and we decided to go riding. I dressed out with my normal riding gear of full face helmet, gloves, winter riding suit and leather boots, jumped on my full dress Honda 1000 Gold-Wing and started out to meet my friends. It felt great being in the saddle again zooming down the highway after weeks of built-up cabin fever.

I topped a hill at about 60 mph and noticed mud and snow on the road where a farm tractor had come out of a field. I hit the mess in the right spot and felt a slight rear wheel side slip. Unconcerned that I'd been given a warning, I continued my carefree, cold journey to meet my friends.

I was just entering a town and slowing to 30 mph when I saw ahead a wet spot in the road which was caused from melting snow dripping off the overhead railroad trestle. I knew this spot well, having driven the route many times. I started over the spot in the left tire track just next to the center line and then it happened — ice. The bike went down hard to the right, throwing me to the hard asphalt. In microseconds I watched the bike slide away, metal sparks flying, fiberglass fairing and bag being ground away. I was able to watch all this because I was sliding two feet from it wondering if this 700-lb. motorcycle would dig in the road and flip upon me.

It was all over in a flash. I and the motorcycle had slid into the oncoming lane of traffic five feet short of a light pole. I went to stand up and felt pain in my right hip. Even with the pain my first thought was to get out of the road. I limped to the side of the road and seconds later a car came upon the scene, another American. I could go on to tell you how my bike was chewed up and how that hurt, but the point is I was very lucky. I received a massive road rash injury to my right hip, sprained fingers on both hands and a scraped right arm and elbow. Had I not been dressed to ride for a fall my injuries would have been much greater, but most of all winter driving for fun is for cars and not motorcycles.

There are only two kinds of motorcycle riders, those that have fallen and those that are going to fall. If one is going to ride and keeps that thought in mind, chances of survival. I'll ride again, but I still ponder the question: What if an oncoming car was coming? What if I had hit the pole? I wonder??

SFC Robert B. Himrod, USA
APO NY 09114

A CINCH

Here's a counterpoint to your Double Tech reply on advanced driving techniques (Feb 84 issue, page 19).

TSgt. Lathrop's reply, in particular the last two sentences of the second paragraph, sure caused my eyebrows to up! He says (in paraphrase) that the Saab front-wheel driving techniques are best left for drivers . . . willing to expend the energy necessary to extract that performance from the machine and themselves. And, "The same information in the hands of an inexperienced driver is downright dangerous." I contend that ANY driver WITHOUT a working knowledge of his machine's maximum levels of performance is dangerous.

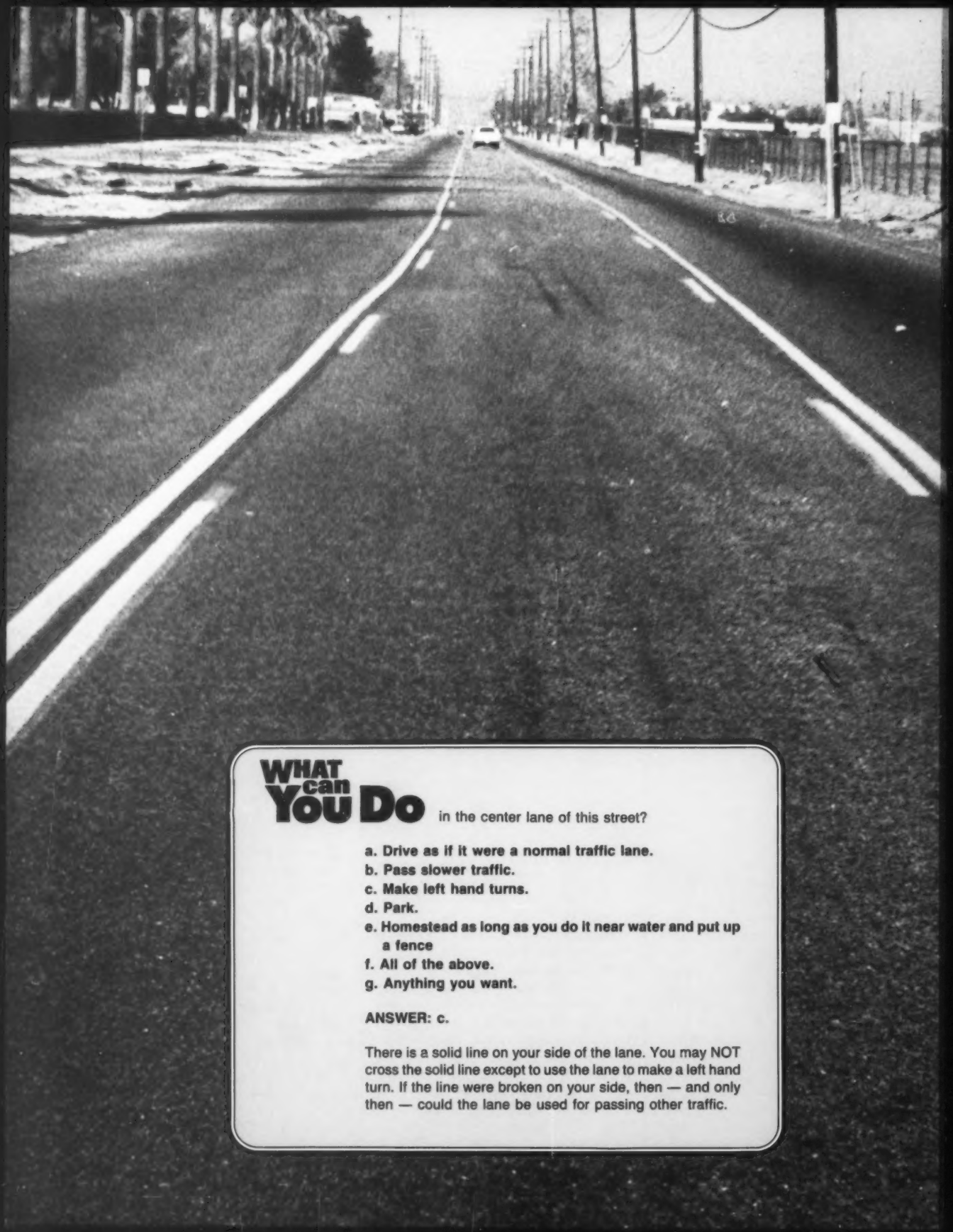
I have more than 19 years of accident-free driving and motorcycle riding behind me. I'm also an active stock car driver and a former autocross racer and motocross rider. I credit my autocross experience, in particular, with making me a much better, safer driver. It was during that time that I learned how far *I* could go, and how to tell when the particular car I might be in is reaching its limits.

Let me share a story. In 1972, the Lowry AFB safety office and the base motorcycle club started a certification program for anyone applying for a base sticker for his two-wheeler. Included was an actual riding test, out on Lowry's unused runways. One fellow, when told he would be required to do an emergency stop from 35 mph, told us he had never done such a thing. After a detailed instructional session and some lower speed practices, he gave it a try. When the very effective front disc brake took hold, this 6-year veteran street rider actually lost his grip on the bars! It was very fortunate he was alone and at a nominal speed. He quickly recovered.

Driving is a cinch! Avoiding injury, damage and death isn't. One must know his own limits and those of his vehicle to survive in the most hostile environment he is normally exposed to. Defensive driving has two faces — one is in minimizing the AMOUNT of danger one must face (by controlling speed, clearance, vision, etc.) The other is taking your own positive steps to physically avoid collision or loss of control when the first step fails. Tell your readers how to handle their vehicles in non-optimal situations. We'll all be better off for it.

Larry R. Anderson, SMSgt, USAF
Minot AFB, ND

☆U.S. GOVERNMENT PRINTING OFFICE: 1984 783—026/5



WHAT can YOU Do in the center lane of this street?

a. Drive as if it were a normal traffic lane.
b. Pass slower traffic.
c. Make left hand turns.
d. Park.
e. Homestead as long as you do it near water and put up a fence
f. All of the above.
g. Anything you want.

ANSWER: c.

There is a solid line on your side of the lane. You may NOT cross the solid line except to use the lane to make a left hand turn. If the line were broken on your side, then — and only then — could the lane be used for passing other traffic.